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overlap considerably ; whereas, according to our author's observations, areas for pain, heat and cold do not overlap perceptibly. They correspond closely to the area of trophic influence supplied by each spinal nerve, these latter being indicated by areas of eruption in herpes zoster. In connection with disease of any visceral organ, disturbances of dermal sensations for pain and temperature are likely to arise over sharply defined areas. Pain in these cases is projected peripherally by allocheiria, *i. e.*, pain in an insensitive portion, *e. g.*, a viscus, being projected to a more sensitive part, the skin, supplied from the same segment of the spinal cord. The present paper deals with arrangement of nerves and skin-areas below the clavicles. The author promises a paper in the near future to cover the region of head and neck.

Untersuchungen über die Entwicklung der Area und Fovea centralis retinae. J. H. CHIEVITZ. *Archiv für Anat. u. Entwicklungsgeschichte.* 1890, pp. 332-365. Plates XVIII.-XX.

Development of retinal elements, especially in the region of the area or fovea centralis, is outlined in four species of bird, viz., crow, finch, domestic pigeon and one of the gulls, *sterna cantiaca*, in one lizard, *lacerta vivipara*, and in a teleost, *sygnathus typhle*. The rabbit possesses no fovea proper, but an area centralis, "streifenförmig," which extends horizontally through the entire retina just below the entrance of the optic nerve. All the birds were found to have a central fovea well developed, and in the gull two foveas were demonstrated, a nasal and temporal, and in addition a "streifenförmige" fovea, which the author does not discuss. The lizard has no fovea, but a circular area centralis situated just above the optic papilla. A "punctförmige" fovea was demonstrated in *sygnathus* located caudad of the optic papilla, somewhat nearer the papilla than the ora serrata. The greater part of the posterior half of the retina is modified into an expanded area centralis having the fovea in its center. The fovea assumes its special characters late in embryonic life.

Untersuchungen über den electrischen Leitungswiderstand der thierischen Gewebe. K. ALT, AND SCHMIDT. *Archiv f. d. ges. Physiol.* Bd. LIII. S. 575. Taf. 13.

Recent work upon this subject has given currency to the idea that the fluids contained in a nerve cause its electrical resistance to be about that of the blood or lymph. The above paper tends to bring us back to the notions of the physiologists who wrote before it was demonstrated, that a nerve impulse is not an electrical current.

The method employed consisted in placing a given length of tissue in the circuit, composed of semi-circles of zinc and copper; contact completing the circuit on the other side being made by a micrometer screw. The zinc arc was connected to a friction machine, the copper with a water-pipe. The electricity generated could thus go to ground either through the tissue or through the micrometer screw. By manipulating the screw it was thus possible to measure the length of the spark, and this was taken to indicate the resistance.

Results of experiments on a large number of organs are given in a table at the end of their article. The following figures are extracted :

Tissue.	Resistance.	Tissue.	Resistance.
Nerve	0.17	Brain	1.57
Muscle	1.00	Tendon	3.25
Blood	1.00	Bone	14.10
Skin	1.25		

The Industries of Animals. FRÉDÉRIC HOUSSAY. Pp. 258, 44 illustrations. London, 1893. English edition revised and enlarged with author's coöperation.

The especial *raison d'être* of this book lies in the parallelism which the author continually holds in mind between the industries of man and the industries of animals. Men placed before a given problem, the attainment of a definite end, have come to act in a certain way; before the same problem, animals from insects to apes proceed in much the same manner. Men hunt in ambush, dig pit-falls, arrange concealed traps; so do beetles, spiders, foxes and cats. Through the whole range of human activity the same is true. The sphere of action may be very small for any animal compared with that of man; but within this narrow sphere the animal solves his problems in general as man would under like circumstances.

What man does intelligently certain writers would insist animals do instinctively. But this distinction is breaking down on all sides. Houssay's view of the relation between instinct and intelligence is clearly expressed in a few words. Instinct cannot be regarded as the "rudiment of intelligence," as is often done. It is rather the essence of intelligence, intelligence "condensed and accumulated" from generation to generation. As actions laboriously learned become reflex and habitual with man, so do adaptations on the part of animals acquired by "reflection, sagacity and intelligence" become by natural selection the common stock of knowledge, the instincts of a species.

Animal industries are grouped under six heads, treated in as many chapters, beginning with the simplest and most primitive, "hunting, fishing, wars and expeditions," and closing with Chapter VII: "The defense and sanitation of dwellings." Chapter VIII is devoted to conclusions. The subjects relating to dwellings, provisions and domestic animals, rearing of young, of course receive their share of attention. Some striking instances are cited. Of the many, I will note a single one (p. 49): An ant is observed to abandon its burden at the foot of a little hillock, over which she has tried in vain to lift it. She soon finds a comrade, also carrying a load; the two consult by means of their antennæ, and both start in the direction of the hillock. On reaching the spot, ant No. 2 lays down her burden, "and both together then seized a twig and introduced its end beneath the first load, which had been abandoned because of its weight. By acting on the free extremity of the twig they were able to use it exactly as a lever, and succeeded almost without trouble in passing their booty on to the other side of the little hillock." The above is given on the authority of Parseval-Deschênes, Paris, 1848. Many other examples are nearly as striking.

The key-note of the book is again struck in a concluding sentence.

"The industries in which the talents of animals are exercised demonstrate that, under the same environment, animals have reacted in the same manner as man, and have formed the same combinations to protect themselves from cold or heat, to defend themselves against the attacks of enemies, and to ensure sufficient provision of food during those hard seasons of the year when the earth does not yield in abundance."